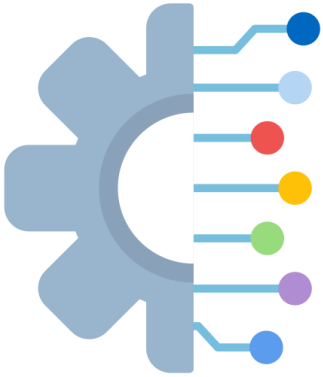
2024-2025
TECHNOLOGY COURSE GUIDE



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Take charge of your future with the successful completion of a CTE track in technology.

Some technology courses are offered every other year, please check the descriptions to see if your favorite course is available next year.

The Career Path Road Map

Trade/CTE (Hands on Focus)

- Drawing and Design for Production (Tech or Engineering)
- Home Repair and Maintenance I - ½ year
- Home Repair and Maintenance II – ½ year
- Design and Fabrication Lab – ½ year
- Basic Electricity and Electronics – ½ year
- Architectural Drafting – ½ year
- 3D Architectural Design – ½ year

Trade/CTE (Computer Focus)

- Drawing and Design for Production (Tech or Engineering)
- Computer Graphics - ½ year
- Computer Animation – ½ year
- Media Productions
- Computer Science Engineering (Honors)
- Basic Electricity and Electronics – ½ year
- Architectural Drafting – ½ year
- 3D Architectural Design – ½ year

Project Lead the Way (Honors)

PROJECT LEAD THE WAY
PLTW
Igniting imagination and innovation through learning.

- Gr 09: Drawing and Design for Production (DDP)
- Gr 10: Computer Science Essentials ½ year
- Gr 10: Principles of Engineering (POE)
- Gr 10: AP Computer Science Principles (APCSP)
- Gr 11: Digital Electronics (DE)
- Gr 11: Computer Integrated Manufacturing (CIM)
- Gr 12: Engineering Design and Development

Manufacturing & Skilled Trades Academy

LANCASTER
MANUFACTURING
& SKILLED
TRADES ACADEMY

- Gr 10: Trade Apprentice
- Gr 11: Trade Journeyman
- Gr 11: Advanced Manufacturing
- Gr 11: Construction Drawings & Modeling
- Gr 12: Trades Senior Project I
- Gr 12: Trades Senior Project II

Trade / CTE Technology - Course Descriptions

Home Repair and Maintenance I

9115 (Fall) Grades 9, 10, 11, 12 *½ credit*

Learn how construction is done. A variety of hand and power tools will be used to complete laboratory activities. The student will also have an opportunity to become familiar with the various materials and fasteners used in home repair and maintenance. Various systems in the home will also be studied: heating, water, electrical, security, sound, etc. Students can develop entry-level skills for future employment in the construction industry.

Home Repair and Maintenance II

9225 (Spring) Grades 9, 10, 11, 12 *½ credit*

This is a hands-on course covering residential structures. Students will learn basics in carpentry, masonry, plumbing, and electrical skills used to build a residential structure. Maintenance and repair of various systems will be stressed. Local building codes and new materials will be investigated. Students can develop entry-level skills for future employment in the construction industry.

Basic Electricity / Electronics

9110 Grades 10, 11, 12 *½ credit*

This course is designed to introduce students to the elements of electricity and electronics. This course offers hands-on experience in building various projects, house wiring, and Basic Electricity/Electronics using circuit boards. This offers an overview of the largest growing field today.

Design and Prototyping Lab (DPL)

9113 Grades 10,11,12 *½ credit*

★Highly Recommended: All PLTW students should take this course to enhance their program experience.

★This is not an official PLTW course

Fabrication Studio is hands-on experience in designing and manufacturing a product. Students will work as a team to design a product and organize all of the production needs from materials needed to processing tools and machines. Students may be exposed to cutting edge production methods like CNC Machining, Laser Cutting, and 3D Printing.

Architectural Drafting and Design

9177 Fall Grades 9, 10, 11, 12 *½ credit*

This course will introduce students to the basic elements of the Architectural profession and the work of an Architect. Students will be introduced to drafting Architectural plans, such as site plans, floor plans, front elevations, and foundation plans. We will also focus on construction techniques and terminology used to create a building and standards used in the industry. Architectural Drafting & Design is a project-based course that involves drawing and model building. This course prepares students for college courses in the areas of architecture, interior design, structural/civil engineering, and drafting.

3D Architectural Design

9174 Spring Grades 9, 10, 11, 12 *½ credit*

★***Recommendation: Architectural Drafting***

This course will build upon the basic elements learned in Architectural Drafting by introducing cutting edge 3-Dimensional software that will be used to create architectural structures. Students will produce computer-generated drawing sheets that contain items such as floor plans, elevations, schedules, and 3D realistic renderings. We will utilize *Autodesk Revit* software.

Computer Graphics

9127 Fall Grades 9, 10, 11, 12 *½ credit*

Interested in creating images for a game or internet site? This course is your starting place! Learn the CGI basics of Adobe Photoshop and Illustrator while getting hands on experience using scanner applications, image correction, and illustration layout. Students will use a variety of Adobe software programs to develop layouts which are used in the CGI industry today.

Computer Animation

9128 Spring Grades 9, 10, 11, 12 *½ credit*

Make your images move! The basics of cell frame animation, movement in a 3-D space, adding sound to a project, recording and editing your own audio will be taught. Use your Multimedia projects for a college application, or you can use your new knowledge to create great presentations for your other classes. Adobe Photoshop, Adobe After Effects, Audacity, Adobe Audition and other CGI industry standard programs will be used.

Media Productions

9131 Grades 10, 11, 12 *1 credit*

★ ***Required: Computer Graphics, Computer Animation, or teacher permission***

Making Movies! Media Productions will show you what it takes to create various media for the Internet, a business, or for your own enjoyment. Included will be the study of the design elements (scenery, sound, and lighting), Green/Blue screen work, and enhancing the video editing techniques learned in Computer Animation (including special effects!). The Adobe Creative Suite will be used throughout the course and you'll create a DVD of your projects for future use.

Design and Drawing for Production (DDP) – Tech (3D Modeling Approach)

9175 Grades 9, 10, 11, 12 *1 credit*

★***Course will satisfy the 1 unit of Regents credit for Art/Music***

DDP Tech is an introductory course, focusing on utilizing the design process to solve technical problems with 2-dimensional drawing techniques and 3 dimensional modeling capabilities. DDP Tech has been designed to replace the traditional CAD class, and offers the skills developed in the Engineering DDP course for students interested in 3-D modeling, but not necessarily in the pre-engineering program (PLTW). Upon successful completion of Tech DDP (this course), an interested and competent student, with the instructor's permission, may apply for the Project Lead the Way Academy Project.

Trades Electives

⚠ ***Note You do not have to be a member of the Trades Academy to take Academy classes, however without taking five courses in Technology you may not qualify for an Advanced Regents diploma. Please talk to your counselor***.

Trade Apprentice……1 Credit

9103 Grade 10 Semester 1 *½ credit*

A foundation class for the Trades Academy: This Apprentice course introduces the concepts and terminology of site planning, foundation elements, wall and ceiling structure, roofing styles, through various projects. This class introduces pattern development for sheet metal work; students will then create various sheet metal projects using industry standard tools.

**Skills Covered:* Various Materials Processing, Sheet Metal Fabrication, Basic Construction Concepts

***Sheet metal projects have included trays, cell phone holder, wall hanging shelf*

9101 Grade 10 Semester 2 *½ credit*

A foundation class for the Trades Academy: This Apprentice course is a survey course that introduces the hands-on skills for a career in trades using carpentry tools, planning, implementing and execution of a project, and beginning concepts of manufacturing. Students will create various projects using industry standards.

**Skills Covered:* Various Materials Processing, Manufacturing Concepts

*** Example project: students each create individual coat rack*

Trade Journeyman……1 Credit

9104 Grade 11 Semester 1 *½ credit*

Journeyman explores the manufacturing process used in the creating and development of products, either for commercial or industrial use. These concepts are further developed in the CNC Machining & Manufacturing class. The students will also learn about plumbing concepts for both residential and commercial buildings. Projects in both copper and PVC pipe are explored.

**Skills Covered:* Various Materials Processing, Plumbing, Architectural Concepts

***Example projects have included PVC toys for the Lancaster Youth Board, copper sprinkler, copper candle holder*

9102 Grade 11 Semester 2 *½ credit*

This is a course that explores the manufacturing process more in depth from design to production. Students further their manufacturing skills integrating the design of products with moving parts.

**Skills Covered:* Various Materials Processing, Manufacturing Concepts, Project Management

*** Example project: students each create folding step stool*

Trades: Construction Drawings & Modeling

9106 Grade 11 *½ credit*

Construction Drawings & Modeling is a course that focuses on understanding drawings related to architecture and building trades, such as plumbing, electrical, and mechanical (MEP). Students will learn plan symbols, review sets of plans of Lancaster High School, and build scale models. They will work in teams and utilize tools, materials, and resources related to the trades.

Trades: Advanced Manufacturing

9105 Grade 11 *½ credit*

Manufactured items are part of everyday life, yet most students have not been introduced to the high-tech, innovative nature of modern manufacturing. This course illuminates the opportunities to understand manufacturing and puts the students in a position to utilize modern manufacturing processes to create projects. Students will be introduced to technologies such as Injection molding, laser cutting, 3D rapid prototyping, and CNC machining.

Project Lead The Way Electives

⚠ ***Note**: You do not have to be a member of the Project Lead The Way Academy in order to take Academy classes, however without five courses in Technology you may not qualify for an Advanced Regents diploma. Please talk to your counselor*.

Engineering Design and Drawing for Production (DDP) - Honors

A Solid Modeling Approach

9162 Grades 9,10, 11, 12 *1 credit - honors*

★Recommended: Currently maintaining an 80%+ in 8th grade Math

Note 1: Students will apply to the Engineering Academy (PLTW) during their freshman year to continue in the Program.

Note 2: Course satisfies the 1 Regents credit for Art/Music, regardless of advancing into the PLTW program.

For all students interested in the Project Lead The Way or Manufacturing and Skilled Trades Academies or any career path in Science, Technology, Engineering, or Mathematics.

Students use the engineering design process, science, and engineering principles to complete hands-on projects. You will work both individually and in teams to design solutions to a variety of problems using 3D modeling software, 3D printing technology creating drawing sheets to document their work. Software utilized: Autodesk Inventor.

Computer Science Essentials (CSE)

9119 Grades 9, 10, 11, 12 *½ credit- honors*

★Recommended: (1) For all students with a general interest in Computer programming and robotics.
(2) Strong background in Math and Science

Students will experience the major topics, big ideas, and computational thinking practices used by computing professionals to solve problems and create value for others. This course will empower students to develop computational thinking skills while building confidence that prepares them to advance to Computer Science Principles & Computer Science A.

Principles of Engineering (POE)

9172 Grades 10, 11, 12 *1 credit- honors*

★Recommended: Honors DDP or Teacher permission from DDP Tech

★Recommended: Permanent or probationary acceptance into the PLTW program

Through problems that engage and challenge, students explore a broad range of engineering topics, including mechanisms, the strength of structures and materials, and automation. Students develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation.

AP Computer Science Principles (CSP)

9129 Grades 10, 11, 12 *1 credit*

★Strongly recommended: Honors Computer Science Essentials or at least 1 year of programming experience.

★Recommended: Strong background in Math and Science

Open doors in any career with computer science! CSE implements the College Board's 2013 CS Principles framework. Using Python® as a primary tool and incorporating multiple platforms and languages for computation, this course aims to develop computational thinking, generate excitement about career paths that utilize computing, and introduce professional tools that foster creativity and collaboration. In CSE, students create apps for mobile devices, automate tasks in a variety of languages, and find patterns in data. Students collaborate to create and present solutions that can improve people's lives, and weigh the ethical and societal issues of how computing and connectivity are changing the world.

Digital Electronics (DE)

9120 Grades 11, 12 *1 credit- honors*

★Recommended: Honors DDP and POE, can take POE or CIM concurrently

★Recommended: Enrolled or Passed level 2 Math

★Recommended: Permanent or probationary acceptance into the PLTW Academy.

From smartphones to appliances, digital circuits are all around us. This course provides a foundation for students who are interested in electrical engineering, electronics, or circuit design. Students study topics such as combinational and sequential logic and are exposed to circuit design tools used in industry, including logic gates, integrated circuits, and programmable logic devices.

Possible career opportunities consist of Digital Electronics Engineers/Technicians, ranging from designing and manufacturing electrical systems to installing to repairing them. Digital electronic engineers design an assortment of electronic equipment, such as control systems, music players and global positioning systems.

Computer Integrated Manufacturing (CIM)

9130 Grades 10, 11, 12 *1 credit- honors*

★Recommended: Honors DDP or permission from DDP Tech

★Recommended: Permanent or probationary acceptance into the PLTW Academy.

Manufactured items are part of everyday life, yet most students have not been introduced to the high-tech, innovative nature of modern manufacturing. This course illuminates the opportunities related to understanding manufacturing. At the same time, it teaches students about manufacturing processes, product design, robotics, and automation.

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